

## **COASTAL ISSUES AND INFORMATION NEEDS**

### **A Summary of the Coastal Issues Symposium held February 10-11, 1999 as part of the USGS Patuxent Wildlife Research Center Annual Science Meeting**

#### **EXECUTIVE SUMMARY**

The Patuxent Wildlife Research Center hosts an Annual Science Meeting of Center scientists and Federal, State, and local partners in natural resource management. This meeting is designed to encourage a maximum amount of dialogue among Center scientists and science partners for the purpose of identifying respective capabilities and information needs and capturing emerging issues. The meeting results are used to shape scientific programs at the Center that are highly relevant to natural resource management needs and maintain high standards of professional excellence. Several areas of emphasis are selected for in-depth discussions at each meeting. One area so highlighted at the February, 1999, meeting was the coastal zone. During two, half-day sessions, internationally recognized leaders in coastal ecology joined forces with Department of the Interior coastal land and resource managers to identify key scientific issues, information gaps, and long-term data needs that are relevant within a coastal resource management framework. Although the issues that arose are applicable at national and global scales, the primary focus of discussions was the eastern U.S. The issues that were identified are summarized here. We hope that this information will yield productive partnerships among scientists and managers whose interests, expertise, and jurisdiction coincide in Atlantic and Great Lakes coastal habitats.

The need for a coordinated approach to research and management of coastal ecosystems has never been greater. Continued population growth in the coastal zone and concomitant urban, industrial, and agricultural development threaten natural resources with a host of anthropogenic stressors. Scott Nixon (University of Rhode Island) identified the primary anthropogenic sources of inorganic nitrogen to coastal waters, including fossil fuel combustion, fertilizer application, sewage treatment plant discharge, and septic system runoff. With increasing world populations and demographic shifts to coastal population centers, fertilizing inputs of nitrogen to estuaries and coastal embayments are expected to rise. Unchecked, the ultimate response to nutrient over-enrichment will be increased eutrophication of coastal systems. Barnett Rattner (USGS) described how resident and migratory vertebrate wildlife of Atlantic coast estuaries are also at risk from environmental contaminants. David Burdick (University of New Hampshire) discussed the historic and continued physical alterations to coastal habitats. Direct impacts to salt marsh and seagrass habitats arise from sediment fill or removal associated with upland and nearshore development projects, and indirect effects persist from hydrologic alterations. As described by Jim Allen(USGS), natural processes contributing to shoreline change can exacerbate the effects of human alterations to coastal environments.

Effective preservation and restoration of coastal ecosystems requires a collaborative approach for establishing research and management priorities, conducting necessary investigations, and applying new information. Problems in the coastal zone stem from complex processes interacting across a variety of temporal and spatial scales, and they require integrated, interdisciplinary responses. Bruce Hayden (University of Virginia / National Science Foundation) described how place-based, long-term ecological research can help detect trends in processes and causes for responses that occur on generational time scales. Peter Barnes (USGS/GD) and Peter Weiskel (USGS/WRD) described broad ranging, physical science expertise within USGS for addressing shoreline change and land-to-sea fluxes of water and materials. These capabilities complement the traditional ecological expertise at Patuxent, and Suzette Kimball, USGS/BRD Eastern Regional Chief Biologist, pledged collaboration across USGS Divisions to tackle coastal issues. Linkages with partner bureaus are essential to this process. Representatives of the National Park Service and the Fish and Wildlife Service with responsibilities for coastal lands and resources in the eastern U.S. identified many common themes, concerns, and information needs related to coastal ecosystem management.

This report is organized within overarching categories presented at the Coastal Issues Symposium: Physical Alterations of Coastal Habitats; Nutrient Enrichment: Sources and Ecosystem Responses; Shoreline Change Processes; and Long-term Monitoring and Research. Each issue includes recommendations for future scientific programs, based on information needs presented by partner bureau representatives and discussions among symposium participants. Specific science needs identified by National Park Service and Fish and Wildlife Service representatives are appended with contact information. We hope that this report serves as a springboard for future professional interaction, collaboration, and scientific investigation of coastal ecosystems in the eastern U.S.

Symposium Organizers:

Jim Allen, Janet Keough, Hilary Neckles, Charles Roman  
USGS Patuxent Wildlife Research Center

COASTAL ISSUES SYMPOSIUM  
February 10-11, 1999  
USGS Patuxent Wildlife Research Center  
Laurel, Maryland

**SYMPOSIUM OBJECTIVES**

*Coastal Issues*

- X Identify key research issues, information gaps, and long-term data needs that are relevant within a resource management framework.

*DOI Land Management Needs*

- X Provide an opportunity for client agencies (e.g., FWS, NPS) to identify their priority coastal issues that require research and technical assistance toward the development of resource management planning, policy development and resource protection.

*Communication and Partnership*

- X Provide an opportunity to foster communication among BRD coastal scientists, other USGS Divisions, and client bureaus; focus discussions on research capabilities that reflect the needs of coastal land managers.

*Strategies*

- X Summarize the key issues, client needs, and opportunities for productive partnerships and develop a strategy for developing a comprehensive coastal studies program that is responsive to land managers and maintains professional excellence.

**AGENDA**

*Wednesday, Feb. 10*

2 - 2:10pm     SYMPOSIUM INTRODUCTION & OBJECTIVES  
**Charles Roman**  
USGS Patuxent Wildlife Research Center - Univ of Rhode Island

**Keynote Addresses**

2:10 - 2:35     PHYSICAL ALTERATIONS OF COASTAL HABITATS  
**David Burdick**  
Jackson Estuarine Laboratory, University of New Hampshire

2:35 - 3:00     NUTRIENT ENRICHMENT: SOURCES AND ECOSYSTEM RESPONSES  
**Scott Nixon**  
Graduate School of Oceanography, University of Rhode Island

- 3:00 - 3:20 Break
- 3:20 - 3:45 SHORELINE CHANGE PROCESSES  
**James Allen**  
 USGS Patuxent Wildlife Research Center - Boston
- 3:45 - 4:10 LONG-TERM COASTAL DATA AND LTER PROGRAMS  
**Bruce Hayden**  
 University of Virginia and National Science Foundation, Div. of Environmental Biology

### **USGS Coastal Research Capabilities**

- 4:10 - 4:35 USGS COASTAL AND MARINE GEOLOGY PROGRAM  
**Peter Barnes**  
 USGS Coastal and Marine Geology Program - Reston
- 4:35 - 5pm USGS WATER RESOURCES DIVISION  
**Peter Weiskel**  
 USGS Water Resources Division, Massachusetts-Rhode Island District

*Thursday, Feb. 11*

### **Issues and Research Needs: DOI Land Managers**

- 8:00a - 8:10 INTRODUCTION TO CLIENT NEEDS AND PERSPECTIVES  
**Janet Keough**  
 USGS Patuxent Wildlife Research Center - Laurel
- 8:10 - 9:10 NPS COASTAL ISSUES AND NEEDS  
**Carl Zimmerman** (Assateague Island National Seashore, MD)  
**David Manski** (Acadia National Park, ME)  
**Michael Rikard** (Cape Lookout National Seashore, NC)  
**Steve Cinnamon** (National Lakeshores, Midwest Regional Office)
- 9:10 - 9:40 FWS REFUGE ISSUES AND NEEDS  
**Janith Taylor**  
 US Fish and Wildlife Service, Region 5
- 9:40 - 10:00 Break
- 10:00 - 10:40 FWS COASTAL PROGRAMS

**Jay Hestbeck**

US Fish and Wildlife Service, Region 5

10:40 - 10:50 CONTAMINANTS ISSUES RELATED TO NPS AND FWS UNITS

**Barnett Rattner**

USGS Patuxent Wildlife Research Center - Laurel

### **Symposium Summary**

10:50 - 11 SUMMARY AND CHARGE FOR THE WORKGROUP

**Hilary Neckles**

USGS Patuxent Wildlife Research Center - Augusta

**1:30p - 4:40 COASTAL BREAKOUT SESSION**

**Continued discussion of coastal issues**

**Organizers:** James Allen, Janet Keough, Hilary Neckles, Charles Roman  
USGS Patuxent Wildlife Research Center

## **NUTRIENT ENRICHMENT OF COASTAL SYSTEMS**

### **Issues**

Increasing world population and continued settlement of the coastal zone is causing nutrient enrichment of coastal ecosystems worldwide. Residential, agricultural, and urban development associated with burgeoning coastal populations has resulted in increased nutrient levels of both surface and ground water supplies. Anthropogenic sources of nutrient loading include septic systems, sewage treatment plants, and fertilizer application. Atmospheric deposition of nitrogen from fuel emissions also contributes to nutrient enrichment of coastal waters, as does mineralization of organic matter inputs from agriculture and aquaculture operations, sewage waste water, and industrial effluents. Excessive nutrient enrichment causes changes in the structure and function of coastal ecosystems. Common ecosystem responses include increased algal growth, increased community metabolism, and decreased dissolved oxygen concentrations. Ultimate changes in ecosystem structure include shifts in the dominant primary producers and alterations of communities of benthos, shell- and finfish, and higher consumers.

### **Research Needs Relevant to Resource Management**

1. Quantify nutrient loading to coastal waters from surface water, ground water, and atmospheric sources.
2. Develop models to predict nutrient loading from easily measurable parameters within developed and undeveloped watersheds.
3. Determine responses of coastal ecosystems to nutrient loading and identify thresholds for specific habitat responses.
4. Quantify responses of higher trophic levels to coastal nutrient enrichment.
5. Determine adequate buffer distances adjacent to upland development projects to protect wetland and estuarine habitats from excessive nutrient inputs.
6. Quantify the cumulative effects of localized point- and non-point source nutrient inputs on coastal watersheds.

## **PHYSICAL ALTERATIONS OF COASTAL HABITATS**

### **Issues**

Historically, human activities have altered coastal vegetated environments through both direct and indirect mechanisms. Direct physical alterations to salt marsh and seagrass habitats include sediment fill associated with upland development, storm protection, or dredge spoil disposal; sediment removal associated with ditching or dredging projects; and physical disturbance from vessels and aquaculture operations. Indirect alterations result from disruptions to physical processes that contribute to maintaining ecosystem structure and function. Examples of such indirect habitat alterations include restriction of tidal flow with dams, causeways, undersized culverts, and other obstructions; changes in freshwater inputs due to dams, sewer and storm drain outfalls, and other types of upland development; and stabilization of shorelines with groins, jetties, and seawalls. Direct and indirect alterations operate at multiple scales, from the level of individual plants to watersheds. In many cases the long-term and cumulative impacts on the structure, function, and sustainability of coastal habitats are unknown. This type of information is needed to guide restoration efforts and predict the outcomes of specific restoration actions. Ultimately, best management practices must be defined to minimize negative effects of surrounding land use on coastal wetland and estuarine habitats.

### **Research Needs Relevant to Resource Management**

1. Determine the long-term impacts of anthropogenic physical disturbance on the structure, function, and sustainability of coastal habitats
2. Evaluate the cumulative effects of small, incremental alterations on coastal habitats
3. Quantify ecosystem responses to various habitat restoration and enhancement practices
4. Identify ecological indicators, standards, and criteria for evaluating the success of restoration efforts
5. Identify immediate threats to living resources from recreational and commercial activities in the coastal zone (e.g. personal watercraft, tour boats, commercial fishing practices)
6. Quantify the causal relationships between physical habitat alterations and detrimental effects of invasive species
7. Identify critical habitat conditions to protect, restore, and manage rare species that are threatened by physical alterations to coastal ecosystems

## **LONG-TERM MONITORING AND RESEARCH**

### **ISSUES**

Biological and physical structures and processes in the coastal zone are driven to a great extent by long-term and large-scale climate- and ocean- related phenomena. Seasonal and annual variability in storms, ocean temperature, erosion/deposition patterns, shoreline development, and plant and animal community development and succession, are examples of coastal processes that require long-term records to understand. Layered over regional processes are local, human developments, such as revetments, channel dredging, introduction of species, and the like; coastal ecosystems respond to such human interventions over the course of years. Understanding long-term phenomena requires a knowledge of ecosystem variation at many scales - seasonal, annual, interannual, decadal and longer - in order to conserve and manage coastal resources at the appropriate scale. Too often, we mistake interannual variation for effects of human impacts or, at minimum, cannot separate human impacts from natural variation. Long-term data can assist us in separating local from regional and anthropogenic from natural effects.

Coastal ecosystem managers in the Department of Interior and other agencies need to be able to address their management needs at the appropriate scale and distinguish long-term trends from short-term natural variation. Managers need to target efforts on trends that can be managed and improved and to recognize ecosystem responses to long-term effects, such as sea-level rise, that cannot be controlled but may be accommodated. Long-term studies and long-term monitoring can provide managers with the necessary information on variation, scale and trends.

### **LONG-TERM SCIENCE APPROACHES TO SUPPORT RESOURCE MANAGEMENT**

- ! Expand programs within USGS to aid DOI Partners in long-term monitoring and assessment, addressing individual large units or complexes of units
- ! Provide incentives for scientists to participate in monitoring programs with encouragement, funding, opportunities for data analysis, and publications on long-term data sets
- ! Host a series of workshops with Partner Bureaus on the topic of long-term monitoring and analysis, including setting measurable goals and objectives, identification of monitoring indicators, approaches to data analysis, and using data in adaptive management
- ! Establish a Science Advisory Board for individual or complexes of National Parks and National Wildlife Refuges to assist with design and review of scientific research and monitoring
- ! Support long-term GIS platforms for National Parks, Wildlife Refuges, and other DOI management units
- ! Develop a program to acquire LIDAR data for every coastal park and refuge every 3-5 years and provide GIS analytical support



## APPENDIX - DOI SCIENCE INFORMATION NEEDS

### NATIONAL PARK SERVICE

#### Assateague Island National Seashore

Carl Zimmerman  
National Park Service  
Assateague Island National Seashore  
7206 National Seashore Lane  
Berlin, MD 21811  
(410) 641-1443 x 213

#### 1. Threats to estuarine water quality from adjacent land use practices and development

Issue: Runoff from residential and agricultural lands adjacent to park may threaten aquatic resources in the park.

Information needs:

- ! Hydrologic and water quality model
- ! Response of fisheries to environmental conditions
- ! Atmospheric deposition data
- ! Chemical contaminants in living resources
- ! Remote sensing tools
- ! Nutrient reduction tools

#### 2. Impacts to coastal processes from adjacent navigation project (Ocean City Inlet)

Issue: A jetty blocks longshore transport of sediment so that the shoreline down-drift of the jetty is sediment starved. A mitigation project involves moving sediment from one side of the inlet to the other.

Information needs:

- ! Automation of geomorphic change data analysis
- ! Post-mitigation habitat assessment
- ! Post-mitigation rare, threatened, and endangered species assessment

#### 3. Protection and management of rare, threatened, and endangered species

Issue: Information on the biology and ecology of rare, threatened, and endangered species is needed to enhance conservation efforts.

Information needs:

- ! Rare species survey
- ! Seabeach Amaranth reintroduction strategy
- ! Tiger beetle (*Cicindela* sp.) biology and impact mitigation strategies
- ! Piping plover banding/markings to determine critical habitat conditions

#### 4. Impacts to island habitats from non-native species

Issue: Several non-native species potentially threaten island ecosystems. One species (feral horses) is actively managed to maintain a low population size.

Information needs:

- ! Census methods for Sika Deer
- ! Genetic variability in feral horse populations
- ! Nutria surveillance
- ! Impacts of horses on freshwater ponds
- ! Sika Deer grazing effects

#### 5. Threats from recreational and commercial activities within park boundaries

Issue: Assateague Island National Seashore receives heavy beach use; some areas allow ORVs and some are restricted to foot traffic. Commercial fishing (hydraulic clamming) also occurs within Park boundaries.

Information needs:

- ! Assess benefits to submerged Aquatic vegetation (SAV) of Ano-take@ sanctuary (no clamming zones)
- ! Personal watercraft effects
- ! Fisheries catch and effort data
- ! Hydraulic clamming impacts on SAV
- ! Fisheries management plans

#### 6. Other issues

Information needs:

- ! Baseline inventories - invertebrates, groundwater
- ! Long-term monitoring program development - groundwater, herptiles
- ! Mosquito ditch restoration

## **Acadia National Park**

David Manski  
National Park Service  
Acadia National Park  
P.O. Box 177  
Bar Harbor, ME 04609

### **1. Air pollution**

Issue: Acadia National Park is a Class 1 airshed under the Clean Air Act. Because of Acadia's unique location in relation to patterns of continental air flow the Park is a recipient of much air pollution. Determining the biological ramifications of airborne pollutants, including ozone, sulfur dioxide, nitrogen oxides, volatile organic compounds, mercury, and acid precipitation on Park ecosystems is a high priority.

Information needs:

- ! How does long-term ozone exposure affect plant genetics and communities?
- ! How do elevated mercury concentrations in Park fish and wildlife affect productivity and behavior?
- ! Do PCB contaminant burdens in Park bald eagles change over time?
- ! What other atmospherically transported toxic substances pose public health and/or ecological risks to Park visitors and natural resources (e.g., dioxins)?
- ! How do Park watersheds, forests, and estuaries respond to nitrogen deposition?
- ! What are the effects of episodic acidification on stream biota?
- ! How does fire influence the fate of atmospherically deposited metals and organic compounds?
- ! Are Park biota at risk from UV exposure?

### **2. Increasing development**

Issue: Continued residential development adjacent to the Park boundary potentially threatens Park resources.

Information needs:

- ! How do Park coastal wetlands respond to increasing amounts of septic waste and yard fertilizers associated with new and expanding residential development on Mount Desert Island?
- ! What are the ecological consequences for Park plant and animal populations of increasing habitat fragmentation outside the Park boundary?

### 3. Conservation of biological diversity - plants

Issue: Acadia supports a very diverse flora due to its location at the intersection of two biogeographic regions and its topography. Many plant species in the Park are considered locally rare and several are listed as globally rare. Although inventories of Park flora have been completed, basic information on factors controlling the distribution and abundance of rare species and communities is lacking. Invasive plant species pose a significant threat to native plant communities in the Park.

Information needs:

- ! Some of the rarest Park plants are abundant in other parts of Maine or New England. Should the NPS be concerned about their rarity in Acadia National Park? What is the Park's role in protecting rare plants?
- ! Should we be trying to protect certain plant populations when their rarity may be related to a natural extinction or the result of vegetation succession?
- ! What are the statistically appropriate long-term monitoring techniques for small populations of rare plants?
- ! What are cost-effective techniques to control highly invasive non-native plants at the Park, such as Japanese barberry, alder buckthorn, and oriental bittersweet?
- ! How do sub-alpine plant communities and boreal forests at Acadia respond to anticipated changes in climate?
- ! What are the long-term effects of browsing on plant succession in a post-fire forest environment?

### 4. Conservation of biological diversity - animals

Issue: Good baseline inventory data exist on some groups of animals, including large mammals, birds, and invertebrates. The historic invertebrate records are particularly extensive, from nearly 30-years of invertebrate surveys in the first part of this century. Baseline data on other animal groups is lacking (estuarine and anadromous fish) or incomplete (amphibians and reptiles). Information on the ecology of various species is also needed.

Information needs:

- ! Have there been changes in the invertebrate fauna over the last 75 years?
- ! What are the effects of landscape disturbance on native pollinators?
- ! What are the most cost-effective techniques to monitor changes in terrestrial invertebrates?
- ! How do harlequin duck survival rates vary among sexes, age classes, and seasons?
- ! What is the status of common eiders nesting on Park offshore islands?
- ! What birds nest in Park estuaries? What role do Park estuaries play as staging habitat for migratory birds?

- ! What raptors nest in the Park?
- ! How have beaver populations responded to forest succession?
- ! What are the effects of fish stocking on native freshwater aquatic ecosystems?

## 5. Social science

Issue: Acadia receives 3 million visitors annually. Information needs focus on maintaining high quality visitor experiences while protecting park resources.

Information needs:

- ! What are the most effective interpretive techniques to educate visitors about important Park natural resource issues?
- ! What are appropriate visitor carrying capacities for sensitive Park habitats such as mountain summits and offshore islands?
- ! What are appropriate visitor carrying capacities for the Schoodic Peninsula and Isle au Haut?
- ! How satisfied are visitors with the Park's new shuttle bus system?

### **Apostle Islands National Lakeshore**

Jerry Banta, Superintendent  
 Julie Van Stappen, Resource Management specialist  
 Route 1, Box 4  
 Bayfield, WI 54814  
 (715) 779-3397

Issues and Information Needs:

- ! Coastal dynamics and sand deposition -- effects on facilities
- ! Contaminants -- bioaccumulation in eagles and furbearers
- ! Commercial fishing waste and bioaccumulation

### **Indiana Dunes National Lakeshore**

Dale Engquist, Superintendent  
 Bob Daum, Resource Management Specialist  
 1100 N. Mineral Springs Road  
 Porter, IN 46304  
 (219) 926-7561

Issues and Information Needs:

- ! Create standardized E. coli monitoring for NPS open water swimming beaches

- ! Create standardized protocols to monitor white-tailed deer populations and impacts of deer on vegetation
- ! Determine best methods of controlling aggressive exotic vegetation
- ! Determine best methods of monitoring rare vegetation
- ! Study biological impacts, water quality impacts, and public reaction to personal watercraft in NPS areas that allow them
- ! Determine best methods for the vegetative restoration of a sedge meadow that has succeeded into a wet forest system once the unnatural drainage patterns (ditches) have been removed
- ! Examine the genotypes of selected isolated native plant species to determine the effects of fragmentation on their population
- ! Assist Park with shoreline erosion studies

### **Isle Royale National Park**

Doug Barnard, Superintendent  
 Jack Oelfke, Chief, Resource Management  
 800 E. Lakeshore Drive  
 Houghton, MI 49931-1895  
 (906) 482-0986

#### **Issues and Information Needs:**

- ! Impacts of motorized recreation on other recreationists
- ! Identification of coastal brook trout habitat
- ! Impacts of hydrocarbon emissions from boats

### **Pictured Rocks National Lakeshore**

Grant Petersen, Superintendent  
 Brian Kenner, Chief, Resource Management  
 P.O. Box 40  
 N8391 Sand Point Road  
 Munsing, MI 49862  
 (906) 387-2607

#### **Issues and Information Needs:**

- ! Impacts of motorized recreation on other recreationists
- ! Impacts of boats on loons, disturbance from tour boats
- ! Monitoring of colony nesting birds
- ! Human impacts on colony nesting birds, effects of tour boat operations (e.g. feeding)

## **Sleeping Bear Dunes National Lakeshore**

Ivan Miller, Superintendent  
Steve Yanco, Resource Management specialist  
9922 Front Street  
Empire, MI 49630-9797  
(616) 326-5134

### Issues and Information Needs:

- ! Coastal dynamics and dune failure
- ! Piping plovers - habitat identification, predation, nest success
- ! User conflict - motorized recreation, impacts on other recreationists
- ! Dune erosion/geomorphology
- ! Timing of precipitation and erosion
- ! Water quality

## **Southeastern Coastal Parks (Cape Hatteras National Seashore, Cape Lookout National Seashore, Cumberland Island National Seashore, Canaveral National Seashore, Biscayne National Park)**

Michael Rikard  
Cape Lookout National Seashore  
131 Charles Street  
Harkers Island, NC 28531  
(252) 728-2250

### 1. Physical coastal processes

Issue: Dredging, groins, jetties, and beach nourishment programs alter natural sediment transport processes and affect Park resources.

#### Information needs:

- ! Oregon Inlet (Cape Hatteras National Seashore)
- ! Cape Hatteras lighthouse
- ! Drum Inlet (Cape Lookout National Seashore)
- ! Effects of Naval Base operations on Cumberland Island National Seashore
- ! Historic structures (Fort Sumpter and Port Pulaski)

### 2. Water quality

Issue: Activities adjacent to Park boundaries may affect Park aquatic resources.

#### Information needs:

- ! Biscayne National Park
- ! Canaveral Mosquito Lagoon
- ! Effects of commercial fishing

### 3. Ground water withdrawal

Issue: Withdrawal of ground water in support of adjacent developed areas may threaten Park resources.

Information needs:

- ! Cape Hatteras National Seashore

### 4. Protection and management of rare, threatened, and endangered species

Issue: Information on the biology and ecology of rare, threatened, and endangered species is needed to enhance conservation efforts.

Information needs:

- ! Sea turtles vs. native raccoons
- ! Piping plovers
- ! Sea beach amaranth

### 5. Impacts to island habitats from non-native species

Issue: Several non-native or invasive species potentially threaten island ecosystems.

Information needs:

- ! Feral pigs at Cumberland Island National Seashore
- ! Feral horses at Cumberland Island and Cape Lookout National Seashores
- ! Feral cats
- ! Nutria
- ! Plants - Phragmites

### 6. Visitor use

Issue: Recreational activities may threaten Park resources.

Information needs:

- ! Effects of off-road vehicles
- ! Effects of personal watercraft
- ! Effects of hunting and fishing

### 7. Inventory and monitoring of Park resources



Issue: Basic information on the status and trends of Park resources is needed to guide conservation and management decisions.

Information needs:

- ! Coastal processes
- ! Vegetation
- ! Wildlife

## **US FISH AND WILDLIFE SERVICE**

### **National Wildlife Refuges in the Northeast**

Jan Taylor  
US Fish and Wildlife Service  
336 Nimble Hill Road  
Newington, MH 03801  
(603) 431-5581

#### **1. Mosquito control issues**

Issue: Application of chemicals for mosquito control may affect non-target aquatic invertebrates and other wildlife. Past marsh manipulation for mosquito control has altered the structure of saltmarsh habitat.

Information needs:

- ! Effects of mosquito control chemicals on shorebird, waterfowl, and wading bird food resources
- ! Impacts of chemical application on other salt marsh wildlife such as saltmarsh sparrow and seaside sparrow
- ! Selection of appropriate management in response to past habitat alterations: restoration versus enhancement
- ! Effects of management on site selection by salt marsh wildlife

#### **2. Coastal restoration techniques compatible with objectives for USFWS Trust Resources and mosquito control**

Issue: Restoration activities in current use include Open Marsh Water Management (OMWM) as defined by the USFWS. Information on ecosystem responses of coastal wetlands to OMWM and other restoration activities is needed.

Information needs:

- ! Hydrologic, physical, and ecological responses to ditch-plugging
- ! Determination of standards and criteria for evaluating restoration success

! Coastal wetland tours for increased communication and training

3. Land use practices in the coastal zone

Issue: Increasing development, public use, and recreational interest in the coastal zone may threaten wildlife resources.

Information needs:

- ! Effects of horseshoe crab harvest on populations
- ! Lack of methods for monitoring horseshoe crabs
- ! Effects of bulk-heading projects
- ! Effects of recreational activities on coastal dependent birds during nesting and migration seasons is needed for Comprehensive Conservation Planning.
- ! Unknown buffer distances adjacent to upland development projects to protect tidal, riparian, and estuarine habitats.

4. Coastal migratory bird issues

Issue: Information on the biology and ecology of migratory birds is needed to enhance management and conservation efforts.

Information needs:

- ! Possible effects of herring and great black-backed gulls on piping plovers
- ! Identification of important foraging areas used by coastal birds, especially colonial species, that nest or roost on refuge lands
- ! Availability of fish stocks from one year to the next for colonial birds
- ! Effects of snow goose eat-outs

**Ecological Services Programs in the Northeast**

Susan Essig  
US Fish and Wildlife Service  
300 Westgate Center Drive  
Hadley, MA 01035-9589  
(413) 253-8611

1. Wildlife use of seasonally saturated wetlands on the coastal plain

Issue: From New Jersey south on the Atlantic Coast, the coastal plain is characterized by wet flatwoods dominated by loblolly pine and other species, including various hardwoods. Many of these wetlands are isolated and are not currently regulated under Federal law. USFWS has trust responsibilities for wetlands in general, and for recovery of the Delmarva fox squirrel, an endangered species that uses this particular type of wetlands.

Information needs:

- ! What species are at risk due to unregulated development of these wetlands?
- ! To what extent do wildlife rely on these drier-end wetlands?

## 2. Buffers for wildlife protection

Issue: Many wetland and riverine restoration projects are undertaken annually by the USFWS, NRCS, EPA, and US Army Corps of Engineers, both to improve the integrity of coastal watersheds and to mitigate for permitted wetland conversions. However, protocols do not exist for the types and widths of upland buffers that should be included in stream reforestation or wetland restoration projects.

Information needs:

- ! What are adequate sizes of buffers along wetlands and streams to support wildlife?
- ! How dependent are wetland wildlife on wetland buffers and stream corridor buffers?

## 3. Appropriate level of monitoring for wetland restoration or creation projects

Issue: Despite the investment of Federal funding in wetland restoration and, to a lesser amount, creation, the preponderance of effort is expended on determining areas suitable for restoration, securing any necessary permits, and the actual restoration activity. Very little attention has been given to monitoring in either the restoration or regulatory (i.e. restoration as compensatory mitigation) arenas. It is critical that an appropriate level of monitoring be instituted to ensure that projects are meeting their scientific objectives.

Information needs:

- ! What hydrologic indicators should be monitored to determine whether a restored wetland is recreating the lost functions and values of the original system?
- ! What vegetation indicators should be monitored to determine whether a restored wetland is recreating the lost functions and values of the original system?
- ! What is the appropriate longevity of a monitoring program?

## 4. Cumulative impacts of coastal development

Issue: Degradation of estuarine and nearshore habitats is a product of numerous small-scale development projects that incrementally affect water quality and aquatic resources. The cumulative impacts of such small-scale alterations are poorly understood.

Information needs:

- ! What are the cumulative effects of small-scale development such as septic systems, docks and pier construction, and localized non-point source pollution on coastal watersheds and estuarine systems?

## 5. Essential components of watersheds

Issue: Coastal watersheds in the Northeast are generally degraded to varying extents. Indicators of general ecosystem health should be developed to help decision makers prioritize restoration projects.

Information needs:

- ! What are the characteristics of an ecologically healthy watershed?
- ! What characteristics must be maintained to sustain ecological health?
- ! To what extent can a watershed be degraded and still maintain ecological functions (i.e., can Assimilative capacity be measured)?

## 6. Habitat requirements for living resources

Issue: The Chesapeake Bay Federal Interagency Program published *Habitat Requirements for Chesapeake Bay Living Resources* in 1991. Since this time, similar characterizations have been done for other estuaries.

Information needs:

- ! Augment existing literature on species determined to be characteristic or indicator species of an estuary.

## 7. Species at risk

Issue: Proactive strategies are needed to reverse species declines and preclude the need for listing under the Endangered Species Act.

Information needs:

- ! Ecology of juvenile Atlantic sturgeon
- ! Survey of Chesapeake Bay tributaries for Atlantic sturgeon
- ! Status of population of the rare skipper, known from only one marsh in Virginia.